Epuræa ornatula new species.

Oblong, slightly elongate, somewhat convex, rufo-testaceous, sparsely clothed with minute yellowish pubescence, scarcely shining; head closely but somewhat indistinctly punctured, front convex with distinct impressions. Antennæ rufo-testaceous, club piceous, third joint twice as long as wide, one third longer than the fourth, fourth and fifth of equal length, six, seven and eight shorter. Thorax one half wider than long, narrowed in front, sides moderately arcuate from apex to one third from the base, thence obliquely narrowed to the posterior angles which are obtuse, distinct, but finely rounded. There is a faint sinuation before the angulations at one third and before the posterior angles. The sides of the prothorax are widely explanate with the margins narrowly but strongly reflexed, especially at and before the middle; the anterior margin is strongly emarginate and the angles prominent though obtuse and rounded; the punctuation is indistinct. The elytra are scarcely broader than the prothorax, and twice as long, scarcely wider at the middle, thence narrowed to the apices which are broadly rounded, side margins rather widely reflexed; punctures rather coarse, close and distinct throughout. Underside as coarsely and closely but not so distinctly punctured. Intercoxal process of the abdomen narrow and triangularly acute. Length 2.25 mm., width 1 mm. (one male).

Male.—Additional abdominal segment, middle tibiæ faintly sinuate on the inner edge and strongly dilated at tip.

This species seems distinct from *E. boreela* Zettr. its closest ally, by its smaller size, color and form.

REVIEW.

A Revision of the Vespidæ of the Belgian Congo based on the Collection of the American Museum Congo Expedition, with a List of Ethiopian Diplopterous Wasps. By J. BEQUAERT. Bulletin of the Amer. Mus. of Nat. History, 1918, 39: 1–384, vi pl. (2 col.), illust.

Abundantly qualified, by reason of several years' field experience in the Belgian Congo and other parts of Africa, a portion of that time in association with Messrs. Lang and Chapin in the expedition referred to in the title, as well as by an intimate knowledge of the diplopterous wasps, Dr. Joseph Bequaert has published a memoir, which, not by reason of its subject matter or its comprehensiveness, but rather by the masterly way in which that subject matter is dealt with, and by the keen taxonomic perception and sound judgment which that treatment manifests, raises its author indubitably to the very front rank of this world hymenopterists. Indeed, it sets a taxo-

nomic standard for this order which has been undeniably equalled by myrmecologists, but rarely by the students of other families, except possibly by one to whom, by reason of his nationality, it is at present a less pleasant duty to pay tribute, the late Franz Friederick Kohl.

The subject matter is more comprehensive than the title of the memoir would imply. Not only in its characteristics as a whole, but genus by genus the Ethiopian fauna is placed in relation to that of other regions, especially as regards the structural characteristics of the African species. The elaboration of excellent structural characteristics for the separation of the species of the various genera of the Belgian Congo will doubtless be a stimulus and a great help to similar work in other regions. The ethology of these wasps, embracing as they do both solitary and social as well as transitional forms, is of a great deal of interest, and Dr. Bequaert not only makes noteworthy contributions to this field, but summarises in connection with each group what is already known.

The general features of the taxonomy mark a decided step in advance in the classification of these wasps, and are in distinct contrast to the somewhat slovenly and ill-digested classifications of Ashmead and Dalle Torre. Dr. Bequaert includes in his family Vespidæ not only the social wasps, but also those solitary and semi-solitary species more often classed as Eumenidæ and Masaridæ. None of the latter come within the Belgian Congo and consequently there is not much said about them. The remaining Vespidæ he divides into eight subfamilies, the extent, distribution characters and ethology of which are expressed in the adjoining table, which I have thought it worth while to draw up from the facts as he states them.

The Raphiglossinæ are a small group transitional between the masarid groups and the diploptera. They are undoubtedly the most generalized of the families tabulated. Dr. Bequaert suggests that *Gayella* may not belong with this group, and in this I am confident that he is correct. The Zethinæ and Eumeninæ, comprising most of the old family Eumenidæ, together contain 75 per cent. of the species and 50 per cent. of the genera of the world of these eight subfamilies. They are both composed of solitary wasps, but each contain species exhibiting development toward social or at least communistic life.

The Stenogastrinæ are a connecting link between the solitary and

the social wasps. They are paper wasps, making open combs, with some of the species solitary, others social.

The remaining subfamilies are the true social wasps, the largest and far the most diversified generically being the Epiponinæ, a tropical group, best developed in South America. The Ropalidiinæ are confined to the tropics of the old world. The Polistinæ, comprising almost exclusively species of the genus *Polistes,* are cosmopolitan. The Vespinæ, belonging almost entirely to the genus *Vespa,* are absent from the neotropical, and except for an invading oriental species and a dubious east coast form are also absent from the Ethiopian. The last subfamily, most highly developed of all from an ethological standpoint, is sharply differentiated from the rest morphologically by the absence of an anal lobe in the hind wing, and by the incised anal area thereof, making the wing almost stalked.

Compared with other tropical regions, and especially the Neotropical, Dr. Bequaert finds the Vespid fauna of the Ethiopian region meager. Especially is this true of the social wasps. As the latter are of the greatest interest to entomologists in general, it may be worth while to summarise his account of those groups in Africa.

Omitting the genus *Vespa,* which is hardly an intrinsic part, the Ethiopian fauna contains only four genera of social Vespidæ, belonging to three subfamilies.

Belonogaster (Epiponinæ), with its thirty-five African species, is second largest of these genera, and is almost exclusively Ethiopian. A nest of wasps of this genus, an open comb of a single layer, is shown by well reproduced photographs. Mr. Lang's description of the process of nest building is of interest: "The building of the cells is done by means of the front legs and the mandibles. The vegetable fibers are mixed with saliva and kneeded between the mandibles; from time to time the paste is rolled between the front legs. This process goes on until the fiber paste is of a uniform, soft consistency; then the wasp applies the paper to the cells and models it into the right position and shape, going over it and over it again with the mandibles. The adults touch the young with their legs, whereupon the latter at once extend their heads to receive food; at the same time they secrete from the mouth a fluid which is absorbed by the adult wasps." This last observation is of interest in connection with the

theory recently advanced by Dr. Wheeler[1] and by E. Roubaud[2] to the effect that the origin of social habits of insects may be traced to the secretion by the larvæ of fluids eagerly sought after by the adults. Dr. Bequaert questions whether the conditions of social life of *Belonogaster,* the absence of true workers, etc., are very primitive, as thought by Roubaud, or are degenerate. A curious and interesting habit of these wasps is that of gnawing away discarded portions of the nest and reutilizing the material to build new parts.

Polybioides (Epiponinæ), of which there are two species, are the only African wasps that enclose their comb in an outer paper envelope. The comb is vertical, several parallel layers hanging within the envelope. These are the only Vespidæ that normally utilize both sides of the comb to build cells, as does the honey-bee. The nests of both species are illustrated by excellent photographs. These wasps are very bellicose, and are uncomfortably prominent features of the Congo region. The nests may reach three feet in length.

The Ropalidiinæ are represented by the genus *Ropalidia* [=*Icaria*] which, with its forty-one species, is the largest of the four genera in Africa. However, only twelve of these inhabit the mainland, the others being found in Madagascar. It builds open combs resembling those of *Polistes.* Some of the species are very common. These three genera are all restricted to the Ethiopian and Oriental, or in the case of *Ropalidia* also Australian regions. The fourth genus of social wasps is the cosmopolitan *Polistes,* which is well represented.

The large number of species of subfamily Eumeninæ (1,900 from all regions) form a dominant, plastic group, and, like all such groups which are undergoing active evolution at present, are peculiarly difficult to deal with taxonomically. Dr. Bequaert's discussion of the characters and variation within this group, and his arrangement, for comparison, of the species of *Odynerus* and *Synagris* in color groups are illuminating.

The exclusively African genus *Synagris* is one of the largest, most common, and by reason of their large size and brilliant color,

[1] A Study of some Ant Larvæ, with a Consideration of the Origin and Meaning of the Social Habit among Insects. By William Morton Wheeler. Proceedings of the American Philosophical Society, 1918, 57: 293–343.

[2] Recherches biologiques sur les guêpes solitaires et sociales d'Afrique. Ann. Sc. Nat. Zool., 1916 (10), 1: 1–160.

TABLE TO THE SUBFAMILIES OF VESPINÆ (EXCEPT

Subfamily.	No. of Genera.	No. of Species.	No. of Species.					Solitary or Social?	Monogynous or Polygynous?	No. of Castes.	Nature of Nest.	Second Cubital Cell Receiving 1 or 2 Recurrent Veins?
			Palearctic.	Ethiopian.	Oriental and Australian.	Nearctic.	Neotropical.					
Raphiglossinæ	4	14	8	4	—	—	2	Solitary.	—	2	—	1
Zethinæ	11	217	4	27	36	2	157	Solitary, tendency toward communism.	—	2	—	2
Eumeninæ ...	22	1,900	337	338	513	223	488	Solitary, progression toward social	—	2	—	2
Stenogastrinæ	1	30	—	—	30	—	—	Solitary or social.	?	?	Open comb.	2
Epiponinæ ...	22	170	—	37	10	2	122	Social.	Monogynous, polygynous.	2 or 3	Open or enclosed comb.	2
Rhopalidiinæ.	3	132	—	41	91	—	—	Social.	Often polygynous.	–	Single open comb.	2
Polistinæ	2	153	6	21	64	15	51	Social.	Usually monogynous.	3	Single open comb.	2
Vespinæ	2	53	16	(2)	30	13	—	Social.	Monogynous.	3	Multiple enclosed comb.	2

the most striking of African solitary diploptera. The author shows that certain of the segments of the palpi are ordinarily shed with the pupal envelopes. *Synagris cornuta* has normally very large horn-like growths on the mandibles of the male, but series show all stages of reduction to mere tubercles. One of the two excellent colored plates shows eight named color-varieties of this species.

MASARINÆ AND EUPARAGINÆ) ACCORDING TO DR. BEQUAERT.

Anal Lobe.	Cubital Cells.	Tarsal Claws.	No. of Apical Spurs on the Middle Tibiæ.	Valvula Receiving Extensory Muscle of Abdomen.	Clypeus.	Mandibles.
Present.	Irregular unequal.	Bifid.	1 or 2.		Rounded, truncate, emarginate.	Short and broad; closing beneath the clypeus; apices toothed.
Present.	Irregular unequal.	Bifid.	1 or 2.		Rounded, truncate, emarginate.	Short, obliquely truncate; folding under the clypeus; apices toothed.
Present.	Irregular unequal.	Bifid, toothed or rarely simple.	1, rarely 2 or 0.		Rounded, truncate, emarginate, rarely pointed.	Elongate, crossing in an × or parallel; closing over tip of clypeus.
Present.	Large rectangular, equal.	Too hed.	2.		Projecting in rounded or sharp point.	Slender, often elongate, toothed on inner margin in ♀, or in ♂ and ♀.
Present.	Irregular unequal.	Simple.	2, rarely 1.	Oval.	As long as broad; apex pointed or bidentate; rarely longer than broad and truncate.	Short and broad; apical margin truncate and toothed; folding over each other under clypeus.
Present.	Irregular unequal.	Simple.	2.	Narrowly compressed.	Broader than long; feebly pointed or rounded.	Short and broad; apex truncate and sharply toothed; folding over each other under tip of clypeus.
Present.	Irregular unequal.	Simple.	2.	Narrow and much compressed.	Ending in a point, rounded or truncate.	Short, quadrate; apices truncate and sharply toothed; folding over each other beneath the clypeus.
Absent.	Irregular unequal.	Simple.	2.		Truncate at apex which is feebly emarginate or ends on 2 lateral teeth.	Short, broad, apex truncate and sharply toothed; closing over each other beneath clypeus.

The author describes an elaborate mite-chamber at the base of the second dorsal segment of *Nortonia bisuturalis,* and in connection therewith he gives an account of mite-chambers in Hymenoptera in general, recounting amongst others, two or three North American species in which he has observed them.

Numerous excellent text-figures of anatomical parts, by the author, and maps of distribution add to the value of the work.

The paper closes with a full reference catalogue of the species of Vespidæ of the entire Ethiopian region.—J. CHESTER BRADLEY.

MISCELLANEOUS NOTES.

Tibicen inauditus.—This cicada was described and figured in the JOURNAL OF THE N. Y. ENTOMOLOGICAL SOCIETY for December, 1917, from the type and two other males collected west of Vega, Oldham County, Texas, July 15, 1917. Miss Mildred McGill has sent me a fourth male collected in the same county at Tascosa, Texas, June 25, 1918.—W. T. DAVIS.

Dorcasta obtusa.—This beetle is described by Henry W. Bates in Biologia Centrali-Americana, Coleoptera, V, p. 372, from Cerro de Plumas, Mexico (Höge), and Mirandilla, Guatemala (Champion). The insect is figured on Tab. 23 (Coleoptera), fig. 1. On May 1, 1912, the writer collected a single example of this species at South Bay, Lake Okeechobee, Florida, which appears to be the first specimen known from the United States, and, according to Mr. Leng's recollection of an unnamed specimen in the Gundlach collection in Havana, occurs also in Cuba. In Mexico, Central America, and South America there are a number of other species belonging to the genus.—WM. T. DAVIS.

The Males of the Roach, Pycnoscelus surinamensis.—In his excellent paper on the Blattidæ of North America Mr. Morgan Hebard has this to say concerning desirable field work and the Surinam cockroach as found in North America: "To find if this insect is parthenogenetic in America; nearly four hundred females have been recorded from this continent, but no males." On page 196 he states further: "In addition to the large series from the United States, we have examined nearly two hundred specimens of this species, chiefly from the West Indies and Mexico, without finding a single male, adult or immature, from the American continent." He further quotes from Brunner, who had males from the East Indies, but "states that not a single male was present in his series of over forty specimens from tropical America."